

Appl. No. 10/069,031
Amdt. dated June , 2006
Reply to Office Action of 03/27/2006

REMARKS/ARGUMENTS

In the Office Action, the Examiner presumes correctly that the subject matter of the various claims was commonly owned at the time of the invention by all the joint inventors.

Claims 46-47, 50-51, 54, 56 and 60-63 were rejected under 35 USC 102 as being anticipated by Wengert (WO 97/06288A1) for reasons set forth in the Office Action.

Claims 40-45, 49, and 57 were rejected under 35 USC 103(a) as unpatentable over Wengert in view of Burk (US 5,788,777) on the grounds set forth in the Office Action.

Claims 48, 55, 58-59, 64-66 were rejected under 35 USC 103(a) as unpatentable over Wengert in view of Flynn et al (US 6,447,604) for the reasons stated in the Office Action.

Claim 53 was rejected under 35 USC 103(a) as unpatentable over Wengert in view of Hirata et al (US 4,542,273) on the grounds set forth in the Office Action.

Claim 52 was rejected under 35 USC 103 as being unpatentable over Wengert in view of Crawley (US 5,871,586) for reasons set forth in the Office Action.

The following argument is presented to show that the present amendment overcomes the foregoing rejections of the claims to provide allowable subject matter in the claims.

Wengert discloses a CVD reaction chamber, which is made entirely of quartz. This CVD reaction chamber does not have an actively heated flow channel. The reaction chamber disclosed by Wengert has a channel and a support plate 40, which are made of a material, which is transparent to the light, which is emitted by the lamps. That means that the substrate, which is supported by the support plate 40, is directly heated by the radiation of the lamps.

To the contrary of Wengert, the present invention has a flow channel, which is actively heated on all sides. Heat for the interior of the flow chamber is provided by hot walls of the reaction chamber. The substrate holder is not directly heated by the heat sources of the invention, the gas phase inside the flow channel is heated by the walls of the flow channel and reaction chamber.

The claims as amended teach that the heated flow channel of the reaction chamber comprises heated walls and is heated on all sides. It is essential, that a wall of the reaction chamber, which lies opposite to the substrate surface, is heated to high

temperature. This is an essential difference from the reaction chamber of Wengert.

The construction of the invention includes a cooling device, which is associated with the gas inlet. The present specification (Page 12, Lines 13-14) describes the inlet as being an actively cooled inlet. In contrast, Wengert discloses water cooling channels in the gas injector. The gas injector is manufactured of stainless steel. It is sealed by use of an O-ring 270 to the reaction chamber, which is made of quartz. The purpose of the water cooling channels is cooling the chamber, comprising the O-ring 270.

The cooling device of the present invention operates for actively cooling the temperature of the process gas entering the processing chamber through the gas injector. As one can see from figures 21 and 25 of Wengert, the water cooling channels are very close to the chamber O-ring 270. They are not able to cool the inside surfaces of the gas injector to cool the process gas to a temperature, which is well below the process temperature in the reaction (process) chamber to avoid decomposition of the process gas before entering the process chamber. The material of the gas injector disclosed by Wengert is stainless steel. Stainless steel is a very poor heat conductor.

It is essential that the process gasses are guided by cooled surfaces of a gas injector until the hot area of the circumferentially hot-walled heated flow channel. There is a very high horizontal temperature gradient between the active

cooled surfaces of the gas injector and the active heated surfaces of the flow channel reactor chamber. These features are emphasized in the amendments to the independent claims 40 and 46.

While the primary reference, Wengert, teaches the use of radiation from heat lamps to heat objects within a chamber, the present invention is directed to a chamber wherein gasses and other objects within the chamber are heated by the hot walls of the chamber. This construction is understood from the present specification (page 2, at line 7, page 5 at lines 35-38, page 6, at lines 20-26) in its discussion of the heated walls.

The feature of cooling the gas at the inlet to the chamber, relative to the temperature of gas within the chamber, is described in the present specification (Page 7, at line 35, to Page 8 at line 12). The advantage of the hot-walled chamber preceded by the cooled gas inlet is disclosed in the specification on page 8 at lines 14-12.


By emphasizing the foregoing inventive features in the amended claims, it is believed that the present claims distinguish over the art of Wengert, considered alone or in combination with the other references. Therefore, the independent claims 40 and 46, as well as their respective dependent claims, are believed to be allowable.

In the event there are further issues remaining in any respect the Examiner is respectfully requested to telephone attorney to reach agreement to expedite issuance of this application.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Since the present claims set forth the present invention patentably and distinctly, and are not taught by the cited art either taken alone or in combination, this amendment is believed to place this case in condition for allowance and the Examiner is respectfully requested to reconsider the matter, enter this amendment, and to allow all of the claims in this case.

Respectfully submitted,
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